

## **REMARKS**

The Applicant appreciates the interview with the Examiner. The Examiner and the Applicant's representative agreed that the cited references, taken alone or together, fail to teach or suggest a burn-through-proof foil as an outermost layer of a panel facing the exterior skin of an aircraft.

The Examiner is incorrect in the use of FAR to exclude a component from application of the definition of "fireproof" as an adjective with the art. Nothing in the FAR excludes materials within the cabin area from being tested and shown to meet the FAA standard of fireproof. Indeed, a person having ordinary skill in the art would not use the term fireproof for any material or component with the art, unless it met this accepted standard.

The Examiner improperly cites to Part 29 of the Code of Federal Regulations for "AIR WORTHINESS STANDARDS: TRANSPORT CATEGORY ROTORCRAFT" and subpart E of this air worthiness standard, which is drawn narrowly to those "designated fire zones" of the powerplant. Part 29 (for transport category rotorcraft) and Part 23 (for transport category airplanes) both adopt the same definition for "fireproof." Indeed, the entire industry, both domestic and foreign, have agreed on identical definitions for fireproof, in order to avoid confusion.

A person having ordinary skill in the art would not expect to find the cabin of a passenger airplane designated within Part 29, subpart E, because this part only lists parts found in rotorcraft powerplants. So, the absence of airplane passenger cabins within Part 29, subpart E is irrelevant to the definition adopted industry-wide for "fireproof."

Nor does it make sense to exclude airframe structures and insulating panels from the common definition for "fireproof" established by the FAA and the industry, merely because the FAA does not require the materials to be fireproof, as a minimum standard of safety. Indeed, if the insulating panels of an aircraft were required by FAR to meet the standard of fireproof today, then no current commercial airliner could meet the FAR's safety standard without a waiver. It was pointed out by the Applicant that the FAA circular set aspirational goals for aircraft cabins and did not establish a new minimum standard, codified by the FAR.

The Examiner incorrectly applies this one section of the Code of Federal Regulations to exclude materials in the passenger cabin from the fire zone **and** the definition for “fireproof” established by the FAA (and within the prior art cited by the Examiner). This is improper.

A person having ordinary skill in the art understands the meaning of “fireproof” to be that defined by the FAA, whether applied to designated fire zones or otherwise. Certain components are listed as being within “Designated Fire Zones” that must meet or exceed the standard defined by “fireproof” as a minimum standard. This does not mean that there is a different definition for “fireproof” for material or components outside of “Designated Fire Zones.” Instead, any material or component to be used in a fire zone, whether designated or otherwise, can be classified as “fireproof” according to the FAA’s definition (which is the definition accepted within the art).

Applicant points out that both the FAR **and** the prior art cited by the Examiner support the definition of “fireproof” referred to by the Applicant. It is a well established, scientifically verifiable definition of fireproof application to aviation, broadly, even if only specific designated components are required to meet or exceed the standard of “fireproof” as defined by the FAA and accepted by those having ordinary skill in the art. The attempt to limit the definition of “fireproof” in the art by pointing to one section of the FAR that requires only certain parts of a rotorcraft to be fireproof is not a rational rebuttal of the evidence offered by the Applicant for a concrete and definitive meaning for “fireproof” that is provided in writing and is supported by the references cited by the Examiner.

Specifically, the Office Action omits any rebuttal of the teachings of the Heitkamp reference, cited by the Examiner, previously. On page 12 of Applicant’s previous remarks, dated April 15, 2009, Applicant pointed to the Heitkamp reference, which teaches the same standard of “fireproof” as the FAA standard provided by the Applicant in the FAA circular, the FAR and used globally by the industry. On page 2, lines 25-26, of the Heitkamp reference refers to “15-minute burn through protection” as a standard of fire proofness applicable to composite sandwich panels. This is no isolated reference selected by the Applicant. Instead, this is a reference selected by the patent office and applied in the prosecution history of this application, which supports the same standard for fireproof identified as a globally-accepted definition as shown by competent authority, the FAA.

To further deny that “fireproof” means what everyone in the industry agrees that it means is to frustrate the purpose of the give and take of patent prosecution. While the patent office can define claims according to the broadest reasonable interpretation within the art, it cannot define the claims more broadly than reasonable. To do so is error.

*In re Skvorecz* is a recent (September 3, 2009) decision by the Court of Appeals for the Federal Circuit based on an appeal of a decision by the Board of Patent Appeals and Interferences (the “Board”). While the Board affirmed an Examiner’s rejection of claims of a reissue application, the Court of Appeals for the Federal Circuit (the “Court”) reversed the Board. According to the Court, the decision of the Board was unsupported by substantial evidence. According to the Court, the “...protocol of giving claims their broadest reasonable interpretation...” is “...solely an examination expedient, not a rule of claim construction...” and “...does not include giving claims a legally incorrect interpretation...” during examination. *Id.* An Office Action cannot adopt an expedient merely to make it easier to reject a claim that should be interpreted otherwise. Indeed, the Court held that adopting a contrary meaning from the meaning that would be understood by a person having ordinary skill in the art after having carefully read the specification, as a whole, is more likely to frustrate prosecution on the merits, rather than advancing prosecution on the merits. The purpose of the examination expedient of giving claims their broadest reasonable interpretation “...is to facilitate exploring the metes and bounds to which the applicant may be entitled..., when the claims are readily changed...,” during the application stage or during a reissue. See *In re Buszard*, 504 F.3d 1364, 1366 (Fed. Cir. 2007); *In re Cortright*, 165 F.3d 1353, 1358 (Fed. Cir. 1999); *In re Sneed*, 710 F.2d 1544, 1548 (Fed. Cir. 1983). According to the Court in *In re Skvorecz*, a claim cannot be rejected “...as a matter of law, if any claimed element or limitation [of a properly construed claim] is not present in the reference.” By disagreeing with the overwhelming evidence presented by the Applicant relating to the definition of “fireproof” accepted within the industry, as shown by competent authority (the FAA) and the Heitkamp reference, a reference cited by the patent office during prosecution of the application, the Office Action is frustrating prosecution on the merits, rather than advancing prosecution on the merits.

Within this context, the refusal to adopt the industry standard for “fireproof” in the most recent Office Action is inconsistent with the rules of claim construction and is unsupported by

any evidence. The resulting, unreasonably broad claim interpretation given to certain claim terms in the Office Action adopts a legally incorrect interpretation of the claims, because claim terms intended to limit the claims are read so broadly as to have no patentable significance, whatsoever. Specifically, the Heitkamp reference distinguished the standard adopted by Fischer from the higher standard of fireproof adopted by Heitkamp, the FAA and the aviation industry, as a whole.

### **No Anticipation**

Chee et al. fails to disclose the elements and arrangement of the elements recited in amended claims 40 and 41. Specifically, Chee et al. fails to disclose: a carbon fiber reinforced plastics composite (CFK) barrier layer being adhered to the bottom-supported cover layer; and a burn-through-proof plastic foil disposed as the outermost layer on the carbon fiber reinforced plastics composite (CFK) barrier layer, as recited in amended claim 40. Therefore, Chee et al. is traversed. None of the other cited references teach or suggest the limitations of claim 40 omitted by Chee et al., taken alone or in combination with any of the other cited references. Therefore, claim 40 is nonobvious over the cited references. Claims 41-42 include the limitations of claim 40 and additional limitations omitted from the cited references. Therefore, claims 40-42 are now in condition for allowance.

In relation to claim 42, the Heitkamp reference is combined with Gorges. But as previously pointed out by Applicant during prosecution of this application, the Heitkamp reference teaches and suggests a synergistic combination for achieving superior flame retardancy, teaching that its invention includes components that each “plays a synergistic part in the overall design and construction,” on page 7, lines 33-36. This means that no person having ordinary skill in the art would be able to vary the synergistic components of Heitkamp as suggested in the Office Action without sacrificing the very synergistic benefits taught by Heitkamp. The Gorges reference teaches the use of the following:

the face sheets to opposite sides of the core; and (iv), a fire-retardant coating comprising a copolymer of vinylidene fluoride and hexafluoropropene applied to at least the exposed surface of the lower face sheet. In certain of the exemplary forms of the invention herein described, the composite, laminar panels are designed to provide

to impart some flame resistance to an otherwise unsatisfactory, but lightweight, honeycomb core sandwich structure made with fiber reinforced phenolic resins. Within Gorges, it is clear that the laminar panels do not meet the standard of fireproof. Now, Heitkamp teaches away from just such a construction, using phenolics, in favor of Heitkamp's own, specific synergistic structure, using inorganics, to achieve 15 minutes of flame resistance, or fireproofness, a much better showing than that suggested by Gorges. Therefore, no person having ordinary skill in the art would modify the teachings of Heitkamp with the teachings of Gorges in the way suggested in the Office Action.

Even if combined, the combination of Heitkamp and Gorges fails to teach or suggest the limitations of claim 40 omitted by the other cited references. Specifically, none of the cited references teach or suggest "...a first plurality of honeycomb cells arranged side by side forming[[,]] a first honeycomb body having a top face ~~and a bottom face~~, and a second plurality of honeycomb cells arranged side by side forming a second honeycomb body having a bottom face, facing in an opposite direction of the top face of the first honeycomb body, the first honeycomb body being joined to the second honeycomb body by at least two carbon fiber reinforced plastics layers between the first honeycomb body and the second honeycomb body, and a top-supported cover layer glued on the top face for facing an interior of the vehicle and a bottom-supported cover layer glued on the bottom face, wherein the first honeycomb body and the second honeycomb body are each comprised of a paper honeycomb or an aramid honeycomb; a carbon fiber reinforced plastics composite (CFK) barrier layer being adhered to the bottom-supported cover layer; and a burn-through-proof plastic foil disposed as the outermost layer on the carbon fiber reinforced plastics composite (CFK) barrier layer, without any intervening metal layers between the burn-through-proof plastic foil and the second honeycomb body," as recited in amended claim 40.

In addition, claim 42 includes the additional limitation "...wherein the top-supported cover layer or the bottom-supported cover layer further comprise: a further carbon fiber reinforced plastics layer, a glass fiber reinforced plastics layer, a third honeycomb body additionally stacked on and glued to the first honeycomb body or the second honeycomb body or a combination of a further carbon fiber reinforced plastics layer, a glass fiber reinforced plastics layer and a third honeycomb body. None of the cited references teach or suggest these additional limitations in combination with the limitations of claim 40, as now amended. Thus, claim 42 is now in condition for allowance.

### **Definiteness and Nonobviousness**

New claim 47 recites the following:

The interior panel of claim 23, wherein the burn-through-proof foil completely encloses an insulation package.

This new recitation replaces claim 36, which is now cancelled, and claims previously depending from claim 36 now depend from claim 47. New claims 48-49 depend from 47, as well.

As illustrated in Figure 10 and disclosed in the examples in the other drawings and the written description, none of the cited references teach any "insulation package" in combination with a honeycomb sandwich panel of any kind, much less the specific arrangement of layers and the foil as now recited in a new dependent claim 47 and claims depending from claim 47.

While the previous Office Action cited Humphries in combination with Fischer as establishing *prima facie* obviousness over claim 36, Humphries is cited merely for its "dampening sheet of vinyl 80" that has nothing at all to do with an "insulation package," as recited in claim 47. Instead, the dampening sheet is for sound absorption. Regardless, no burn-through-proof foil completely encloses the dampening sheet of Humphries. Nor would a person having ordinary skill in the art be able to combine Humphries and Fischer to include a burn-through-proof foil completely enclosing the dampening sheet of Humphries. And there is no logical reason to do so. A combination of the cited references fails to teach or suggest all of the limitations of claim 47, and its dependent claims, because there is no teaching or suggestion

of the rearrangement of the layers as recited in the claims, as now amended, and Fischer teaches away from any rearrangement of the layers of Fischer, which would make the benefits suggested by Fischer inoperative.

Indeed, the dampening sheet of Humphries is located between honeycomb cores (not completely enclosed within the outermost layer of burn-through-proof foil). Furthermore, any combination of Fischer and Humphries would still not teach or suggest all of the limitations of claim 47, such that the outermost layer of the interior panel facing the outer skin of the aircraft would completely inclose the dampening sheet of Humphries. Instead, the damping sheet of Humphries, which serves the purpose of sound dampening, would merely be inserted within a pair of honeycomb core bodies. Thus, the combination fails to establish *prima facie* obviousness over claim 47 and any of the claims depending from claim 47.

During the interview, the Applicant's representative pointed out that the insulation package is supported in the specification and clarified the location of the insulation layer within the insulation package. Support for the new claims is provided from original claim 36, the drawings and written description, such as Figure 10, for example. With respect to the combination of Fischer and Humphries, which was asserted against claim 36, neither Fischer nor Humphries, taken alone or in combination, teach or suggest the insulation package, "wherein a burn-through-proof foil completely encloses an insulation package," as recited in claim 47, or any of the additional elements of claims depending from claim 47. Nor is the dampening layer of Humphries found at an outermost layer of a honeycomb cone panel. Therefore, claim 47 is nonobvious over the cited references, because the cited references taken together, fail to establish *prima facie* obviousness over claim 47.

Claims 37-39, 43, and 48-49 now depend from claim 47, incorporating all of the limitations of claim 47 omitted by the cited references and additional limitations omitted by the cited references. Therefore, claims 37-39, 43 and 48-49 are now in condition for allowance.

Claims 44 - 46 are cancelled.

Support for the amendment to claims 33, 40 and 41 is found in paragraph [0060] of the specification, for example. The amendments to claim 33, claim 28 and claim 27 overcome the objection to claim 33 on page 2 of the Office Action.

All of the examples of aramide have been amended to aramid, as requested by the Examiner on page 2 of the Office Action.

The amendments to the claims and the interview with the Examiner overcome the rejections for indefiniteness. The Applicant's representative explained the orientation of the layers in the claims and drawings, explaining how one should be related to another by a person having ordinary skill in the art in light of the teachings in the specifications.

In contrast, the Applicant's representative and the Examiner considered the teachings of Fischer, taken alone or together with other cited references, as one of the primary references still being cited against the claims, the Applicant's representative quoting extensively from column 1, line 24 to column 2, line 13. The object of the invention of Fischer is to overcome the shortcomings of epoxy-filled carbon fiber reinforced sandwich panels known in the prior art and epoxy-bonded phenolic-resin filled carbon fiber reinforced sandwich panels known in the prior art. To do this, the invention of Fischer requires "a layer of fibres or fibre-reinforced materials ... disposed on the layer of material which has a high melting point and a high combustion temperature." This arrangement is necessary to the invention of Fischer, because it makes it "impossible for the layer having a high melting point and a high combustion temperature to melt if flames occur at a temperature which is higher than the melting point of said layer, since a gas-insulating layer is formed as a result of the layer of fibres or fibre-reinforced material being burned-off, and such layer serves as insulation against the influence of heat for the layer disposed below." Thus, Fischer teaches away from placing the foil as the outermost layer of the insulation package or panel. Instead, Fischer places a relatively thick layer of a low-load, phenol-impregnated fibrous layer as a shield to a metal foil layer, as a heat spreader, and (finally) a structural adhesive layer. None of the layers may be omitted or rearranged to achieve the benefits suggested for each layer by Fischer.

Also, the same section of the Background teaches that epoxy-filled carbon fibre layers of the prior art are unsuitable as a burn-off, outermost layer of an interior panel arrangement, because "the density of the smokes (sic) and the toxicity are also increased to an unacceptable level." See col. 1, lines 34-37. Instead, Fischer teaches that phenol resins (instead of epoxy resins) may be used for the outermost, gas-insulating layer, because "they meet the requirements regarding combustibility and also give off relatively few (sic) smokes (sic)," but



the phenolic resins do not meet structural requirements, according to Fischer, because the phenolic resins do not bond well, requiring an adhesive layer of epoxy resin anyway, producing less smoke than epoxy-filled layers but still unacceptable levels of toxic smoke, a conundrum for the prior art that was not solved until Fischer's invention. See column 1, line 24 to column 2, line 13.

Fischer's synergistic invention combines an outermost layer of phenol impregnated fibers (low load) with a comparatively "high melting point metal layer" as the next layer, which Fischer discloses as aluminum, preferably, and an epoxy filled fibrous layer or layers for structural integrity, in that order, such that the phenol burns off with less toxic smoke than the prior art, requiring an epoxy resin layer, and protects the metal layer from melting during a fire. The metal layer protects the epoxy filled fibrous layer(s) from localized heating as a heat spreader, and the structural layer(s) protected by the metal foil layer and the phenol-impregnated layer provides acceptable structural properties, interlayer adhesion and adhesion to the core, while being protected by the other layers.

While Fischer makes additional suggestions that it is "conceivable" to substitute other materials with melting points greater than 400 degrees centigrade for the aluminum foil, Fischer does not suggest altering the order of the layers to place any foil on the outermost surface of a panel and does not teach or suggest the elements of the pending claims.

Indeed, Fischer teaches the importance of keeping "the weight of the structural panel very low" and merely suggests "desirable metals, e.g. copper or steel" as "conceivable" substitutes for the aluminum foil taught in the invention of Fischer. The aluminum foil does not melt when configured as taught by Fischer. And Fischer teaches that putting a metal foil at a surface is ineffective. So, the composite structure of Fischer would still not achieve any level of fire resistance greater than that taught for aluminum foil, which already does not melt until the phenolic layer burns through. The rapidly consumable phenolic impregnated fibrous layer is already known within the background of Fischer to be ineffective in preventing burn through without the specific arrangement of layers taught by Fischer. Thus, the phenolic impregnated fibrous layer, the outermost layer in Fischer, is not a burn-through-proof foil. Nor is the metal foil of Fischer an outermost layer of the interior panel facing the outer skin of the aircraft, as recited in claim 23, as amended.

Also, Fischer specifically teaches away from U.S. Pat. No. 3,518,156, which includes an outermost metal layer and teaches the rapid (19 second) failure of a comparatively thick (0.032 inches) aluminum skin, even one with a temperature between only 700-800 degrees centigrade, within only 19 seconds. *See* column 1, lines 38-54 of Fischer, and column 3, lines 63-65 of U.S. Pat. No. 3,518,156. Thus, no person having ordinary skill in the art would even attempt to position the metal foil of Fischer as an outermost foil layer, when the teachings of both Fischer and the prior art reference distinguished by Fischer teach away from doing so.

Thus, combining Fischer in a way that rearranges its layers to one having an outermost layer of a burn-through-proof foil is not consistent with the teachings of Fischer, itself. Indeed, Fischer teaches that such a rearrangement of the layers will necessarily meet with failure (i.e. melting/consumption of the exposed layer and damage to the underlying structural layers). The metal foil must be protected by an outer layer that outgases to insulate the metal for a time but not an unacceptably toxic smoke. However, Fischer teaches that this phenolic impregnated layer is very limited in its duration of protection offered and does not meet the standard for a burn-through proof foil. Indeed, the purpose of the phenolic fiber layer is to burn and outgas, protecting the metal foil for a time. Even a phenolic impregnated fibrous layer that uses an epoxy-based adhesive produces too much toxic smoke, according to Fischer. Thus, Fischer teaches and suggests only a specific arrangement of specific layers, in a specific sequence that is critical to the success of Fischer, which success is limited to a comparatively low state of flame and smoke resistance. And taken alone, or in combination with any other cited reference, the cited reference fails to teach or suggestion all of the limitations of the claims, as now amended. No person having ordinary skill in the art would expect to better optimize the teachings of Fischer than suggested by Fischer, in its preferred embodiment.

In addition, Fischer, taken alone or in combination with any of the other cited references, does not teach or suggest an outermost burn-through-proof foil as arranged in amended claim 23. As previously stated “burn-through-proof” means fireproof, as defined by the FAA and accepted within the industry at the time of filing of this application. The Fischer reference acknowledges that the composite panel of Fischer falls far short of fireproof and is merely drawn to a much lower standard of flame and smoke resistance. It is not conjecture. It is a fair reading of Fischer, itself, which reports the difficulty of finding a balance between fire

resistance and weight, which is widely recognized as a trade-off within the industry by a person having ordinary skill in the art.

Also, a fair reading of Fischer expressly teaches away from placing its metal foil layer as the outermost layer of a panel structure, because it is known to melt in a fire, as taught by Fischer, itself. There is no teaching or suggestion within Fischer or within the art that would suggest a similar weight of foil of copper or steel would achieve any greater degree of fire safety. Indeed, the capability of aluminum to shield a layer below it is well known in the art. Fischer merely teaches interchangeability, conceivably, without more. And Fischer acknowledges the importance of the weight of any added layers; therefore, there is no teaching to replace the aluminum foil of Fischer with a heavier metal foil or a thick metal sheet for replacing a thin aluminum foil. Indeed, Fischer teaches away from a thick sheet of any metal. A "metal foil" is known to be a thin layer of metal. Taken alone or in combination with any other reference, Fischer fails to teach or suggest "...a burn-through-proof foil arranged such that the burn-through-proof foil conforms to an outer surface of the bottom-supported cover layer facing the space, wherein the burn-through proof foil is the outermost layer of the interior panel facing the outer skin of the aircraft," as recited in amended claim 23. Thus, all of the claims, which incorporate this limitation of claim 23, the other limitations of claim 23, and additional limitations of the dependent claims, are nonobvious over the cited references, including claims 24-30, 33-35, 37-39, 43 and 47-49.

Also, Fischer teaches away from an epoxy-resin filled carbon fibre outer layer, because it creates an unacceptable level of toxic smoke. Therefore, the only example endorsed by Fischer et al. is a reinforced phenol layer as the outer layer with an aluminum layer being protected by the phenol layer, which burns off during a fire, and structural layers being covered by the phenol layer and the aluminum layer to protect them from the heat of a fire during an emergency. Therefore, no person having ordinary skill in the art would combine Fischer with any other reference to apply a burn-through-proof foil outermost on an outer surface of the bottom-supported cover layer facing the space.

Furthermore, nothing in any of the cited references, including Fischer, taken alone or in combination, teaches or suggests the burn-through-proof foil enclosing the insulation package within the burn-through-proof foil, as recited in new claim 47.

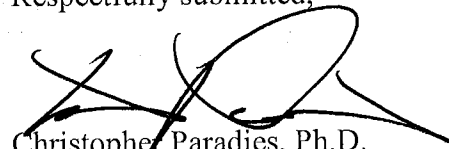
The Examiner and his supervisor recommended that the claim be amended to specify that the burn-through-proof foil is the "outermost burn-through-proof foil" and that the insulation package is enclosed "within" the outermost burn-through-proof foil. These amendments have been made to the claims, and the claims are now in condition for allowance.

Entry of the amendments to the claims is respectfully requested. No new matter is added by any of the amendments.

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Respectfully submitted,



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